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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
| 10/643,307 | 08/19/2003 | Louis L. Hsu | YOR920030075US1 (8728-613) | 8130 |
| 46069 | 7590 | 03/02/2005 | EXAMINER | |
| F. CHAU & ASSOCIATES, LLC 130 WOODBURY ROAD WOODBURY, NY 11797 | | | WILCZEWSKI, MARY A | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2822 | |

DATE MAILED: 03/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|-------------------------------|----------------------------|--|
| Office Action Summary | Application No. 10/643,307 | Applicant(s) HSU ET AL. | |
| | Examiner M. Wilczewski | Art Unit 2822 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 December 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5,7-28,46 and 47 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-5,7-28,46 and 47 is/are allowed.
- 6) ☒ Claim(s) 44 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office action is in response to the amendment filed on December 17, 2004.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 44 is again rejected under 35 U.S.C. 102(e) as being clearly anticipated by Tsai et al., U.S. Patent 6,593,185, of record.

Tsai et al. disclose a method of forming an embedded capacitor structure which comprises forming at least a first via for incorporation into the capacitor (26) and forming simultaneously at least a second via for an interconnection (24/22), depositing a sidewall liner material (28) in the first and second vias, and removing a predetermined portion of the sidewall liner material to form spacers on the sidewalls of the first and second vias, see figures 3 and 4. Note in column 5, lines 12-14, that Tsai et al. disclose that a portion of liner 28 is planarized by polishing, hence, Tsai et al. teach to remove a predetermined portion of the sidewall liner material to form spacers on the sidewalls of the first and second vias.

Allowable Subject Matter

Claims 1-5, 7-28, 46, and 47 are allowable over the prior art of record.

Response to Arguments

Applicants' arguments filed December 17, 2004, have been fully considered but they are not persuasive. Applicants have argued that claim 44 has been amended to recite the steps of depositing a sidewall liner material in the first and second vias and removing a predetermined portion of the sidewall liner material to form **spacers** on each sidewall of the first and second vias. Applicants have further argued that Tsai shows a liner layer 28 which is deposited in a trench 22, a via 24, and an opening 26 such that the liner layer 28 lines both the sides and bottom of each of the trench 22, via 24, and opening 26. Applicants have further argued that in their disclosure, as shown in Figures 17 and 18, for example, the sidewall liner material 380 is removed from the bottom of the openings 370A and 370B, leaving only the spacers 390 on the sidewalls of openings 370A and 370B. First, Applicants' arguments are not commensurate in scope with claim 44. Whereas Applicants disclose in their specification that liner material is removed from the bottom of the openings in their method, claim 44 does not require the liner material to be removed from the bottom of the vias. Second, recitation of the removal of a portion of the sidewall liner material to form spacers on the sidewall of the vias does not implicitly require removal of the liner material from the bottom of the vias.

Tsai et al. clearly teach to form sidewall liner material in the first and second vias (layer 28) and to remove the portion of layer 28 formed on the top surface of the substrate by polishing thereby planarizing the substrate surface. Planarization of layer 28 results in the formation of spacers on the sidewalls of the first and second vias, as shown in figure 4. Claim 44 merely recites removing a predetermined portion of the liner material and does not require this predetermined portion to be the portion of the liner material at the bottom of the trench. As argued previously removal of the portion of liner material 28 from the top surface of the substrate in Tsai's method results in the formation of spacers on the sidewalls of first via 26 and second via 22/24. A spacer is defined as something inserted between two things to keep them apart. The portion of Tsai's liner material which is formed on the sidewall of first via 26 and second via 22/24 clearly acts as a spacer between first dielectric layer 18 and copper layer 30, 32. Although figures 17 and 18 show removal of liner material in the bottom of trenches 370A and 370B to form spacers 390, Applicants have not explicitly defined the term "spacer" in their specification. Hence, for purposes of rejecting claim 44, "spacer" has been given the common dictionary definition.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Wilczewski whose telephone number is (571) 272-1849. The examiner can normally be reached on Monday and Thursday.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



M. Wilczewski
Primary Examiner
Tech Center 2800